

CLAIMS

1. A method of reducing current leakage through at least a portion of a dielectric material of a semiconductor construction comprising utilizing a laser to generate one or more activated species which react with a component of the dielectric material to reduce the leakage of current through the dielectric material.
2. The method of claim 1 wherein the activated species comprises an activated oxygen species which reacts with the component to increase an oxygen content of the dielectric material.
3. The method of claim 1 wherein the dielectric material comprises oxygen and one or more non-oxygen components, and wherein the activated species comprises an activated oxygen species which reacts with at least one of the non-oxygen components.
4. The method of claim 1 wherein the dielectric material is a predominantly inorganic material.
5. The method of claim 1 wherein the dielectric material comprises tantalum and oxygen, and wherein the activated species comprises a species which reacts with the tantalum component of the dielectric material.

6. A method of increasing a dielectric constant of at least a portion of a dielectric material of a semiconductor construction comprising utilizing a laser to generate one or more activated species which react with a component of the dielectric material to increase the dielectric constant of the dielectric material.

7. The method of claim 6 wherein the activated species comprises an activated oxygen species which reacts with the component to increase an oxygen content of the dielectric material.

8. The method of claim 6 wherein the dielectric material comprises oxygen and one or more non-oxygen components, and wherein the activated species comprises an activated oxygen species which reacts with at least one of the non-oxygen components.

9. The method of claim 6 wherein the dielectric material is a predominantly inorganic material.

10. The method of claim 9 wherein the dielectric material comprises tantalum and oxygen, and wherein the activated species comprises a species which reacts with the tantalum component of the dielectric material.

11. A method of treating a predominantly inorganic dielectric material on a semiconductor wafer comprising utilizing a laser to generate at least one activated oxygen species which reacts with a component of the dielectric material to increase an oxygen content of the dielectric material.

12. The method of claim 11 wherein the activated oxygen species comprises a component formed by impacting O<sub>3</sub> with the laser beam.

13. The method of claim 11 wherein the dielectric material comprises a metal and oxygen, and wherein the activated oxygen species comprises a component which reacts with the metal component of the dielectric material.

14. The method of claim 11 wherein the dielectric material comprises tantalum and oxygen, and wherein the activated oxygen species comprises a component which reacts with the tantalum component of the dielectric material.

15. The method of claim 11 wherein the dielectric material comprises silicon and oxygen, and wherein the activated oxygen species comprises a component which reacts with the silicon component of the dielectric material.

16. The method of claim 11 wherein the wafer comprises a center, a first edge and an opposing second edge; the first edge being spaced from the opposing second edge by a distance across the center of the wafer, and wherein the laser beam comprises a region which extends a majority of the distance across the center of the wafer.

17. The method of claim 11 wherein the wafer comprises a center, a first edge and an opposing second edge; the first edge being spaced from the opposing second edge by a distance across the center of the wafer, and wherein the laser beam comprises a region which extends an entirety of the distance across the center of the wafer.

18. The method of claim 11 further comprising incorporating the treated dielectric material into a capacitor construction as at least a portion of a dielectric region between a pair of capacitor electrodes.

19. A method of treating a predominantly inorganic dielectric material on a semiconductor wafer comprising passing a laser beam across at least a portion of a surface of the dielectric material to generate at least one activated species which contacts the dielectric material.

20. The method of claim 19 wherein the laser beam is passed across an entirety of the surface of the dielectric material.
21. The method of claim 19 wherein the passing the laser beam across the surface comprises moving the wafer relative to the laser beam.
22. The method of claim 19 wherein the passing the laser beam across the surface comprises moving the laser beam relative to the wafer.
23. The method of claim 19 wherein the laser beam comprises a region which extends a majority of a distance from one edge of the wafer to an opposing edge across a center of the wafer relative to said one edge.
24. The method of claim 19 wherein the laser beam comprises a region which extends an entirety of a distance from one edge of the wafer to an opposing edge across a center of the wafer relative to said one edge.
25. The method of claim 19 wherein the laser beam comprises a focussed region, said focussed region being in a shape of a band which extends a majority of a distance from one edge of the wafer to an opposing edge across a center of the wafer relative to said one edge.

26. The method of claim 19 wherein the laser beam comprises a focussed region, said focussed region being in a shape of a band which extends an entirety of a distance from one edge of the wafer to an opposing edge across a center of the wafer relative to said one edge.
27. The method of claim 19 wherein the laser beam is focussed at a location above the surface of the dielectric material, and wherein the laser beam impacts a substance at the location to form the at least one activated species; the at least one activated species migrating from the location to the surface of the dielectric material to contact said dielectric material.
28. The method of claim 19 wherein the laser beam is focussed at a location from about 2 mm to about 4 mm above the surface of the dielectric material, and wherein the laser beam impacts a substance at the location to form the at least one activated species; the at least one activated species migrating from the location to the surface of the dielectric material to contact said dielectric material.
29. The method of claim 28 wherein the substance comprises O<sub>3</sub>, and wherein the activated species include activated oxygen.

30. The method of claim 19 wherein the activated species include activated oxygen.
31. The method of claim 19 further comprising incorporating the treated dielectric material into a capacitor construction as at least a portion of a dielectric region between a pair of capacitor electrodes.
32. A method of treating a predominantly inorganic dielectric material, comprising:
  - providing a precursor at a location proximate the dielectric material;
  - providing a laser beam focussed at the location, the laser beam generating an activated oxygen species from the precursor; and
  - contacting the activated oxygen species with the dielectric material.
33. The method of claim 32 wherein the precursor comprises O<sub>3</sub>.
34. The method of claim 32 wherein the precursor comprises O<sub>3</sub> diluted to a concentration of from at least about 1% to less than 100% in O<sub>2</sub>.
35. The method of claim 32 wherein the location is from about 2 mm to about 4 mm above a surface of the dielectric material.

36. The method of claim 32 wherein the dielectric material comprises an oxide of a material, and wherein the activated oxygen species reacts with portions of the material that are not fully oxidized to increase an amount of oxidation of such portions.

37. The method of claim 32 wherein the dielectric material comprises tantalum oxide, and wherein the activated oxygen species reacts with portions of the tantalum oxide that have a higher ratio of tantalum to oxygen than  $Ta_2O_5$  to convert such portions to  $Ta_2O_5$ .

38. The method of claim 32 wherein the dielectric material comprises silicon and oxygen, and wherein the activated oxygen species reacts with portions of the dielectric material to decrease the ratio of silicon to oxygen within the dielectric material.

39. The method of claim 32 wherein the dielectric material comprises tantalum oxide over a mass of  $Si_xO_yN_z$ , wherein x, y and z are greater than 0, and wherein the activated oxygen species reacts with one or both of (1) portions of the tantalum oxide that have a higher ratio of tantalum to oxygen than  $Ta_2O_5$  to convert such portions to  $Ta_2O_5$ ; and (2) portions of the mass of  $Si_xO_yN_z$  to decrease the ratio of silicon to oxygen within the mass.

40. The method of claim 32 wherein the precursor is a fluid flowed across a surface of the dielectric material.
41. The method of claim 32 wherein the precursor is a gas flowed across a surface of the dielectric material.
42. The method of claim 32 further comprising incorporating the treated dielectric material into a capacitor construction as at least a portion of a dielectric region between a pair of capacitor electrodes.
43. A method of forming a capacitor construction, comprising:
  - forming a first capacitor electrode supported by a semiconductor substrate;
  - forming a dielectric material over the first capacitor electrode;
  - providing a precursor at a location proximate the dielectric material;
  - providing a laser beam focussed at the location, the laser beam generating an activated oxygen species from the precursor;
  - contacting the activated oxygen species with the dielectric material; and
  - after the contacting, forming a second capacitor electrode over the dielectric material.

44. The method of claim 43 wherein the precursor comprises O<sub>3</sub>.
45. The method of claim 43 wherein the precursor comprises O<sub>3</sub> diluted to a concentration of from at least about 1% to less than 100% in O<sub>2</sub>.
46. The method of claim 43 wherein the location is from about 2 mm to about 4 mm above a surface of the dielectric material.
47. The method of claim 43 wherein the dielectric material comprises an oxide of a material, and wherein the activated oxygen species reacts with portions of the material that are not fully oxidized to increase an amount of oxidation of such portions.
48. The method of claim 43 wherein the dielectric material comprises tantalum oxide, and wherein the activated oxygen species reacts with portions of the tantalum oxide that have a higher ratio of tantalum to oxygen than Ta<sub>2</sub>O<sub>5</sub> to convert such portions to Ta<sub>2</sub>O<sub>5</sub>.

49. The method of claim 43 wherein the dielectric material comprises silicon and oxygen, and wherein the activated oxygen species reacts with portions of the dielectric material to decrease the ratio of silicon to oxygen within the dielectric material.

50. The method of claim 43 wherein the dielectric material comprises tantalum oxide over a mass of  $\text{Si}_x\text{O}_y\text{N}_z$ , wherein x, y and z are greater than 0, and wherein the activated oxygen species reacts with one or both of (1) portions of the tantalum oxide that have a higher ratio of tantalum to oxygen than  $\text{Ta}_2\text{O}_5$  to convert such portions to  $\text{Ta}_2\text{O}_5$ ; and (2) portions of the mass of  $\text{Si}_x\text{O}_y\text{N}_z$  to decrease the ratio of silicon to oxygen within the mass.